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BULLETIN

# THE TEACHERS COLLEGE AND POST-WAR RECONSTRUCTION

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# FOREWORD

In time of war it is wise to prepare for the peace that is to follow. Educational institutions should play an important part in the social, political, economic, and educational readjustments that will inevitably follow the global conflict now in progress. Many domestic issues affecting vitally every citizen of this country demand attention. The manner of their settlement will affect our lives, our welfare, our standards of living for many years to come.

The state teachers college is a leader of thought in the broad field of general public education. It probably comes in as intimate touch with the intelligent and aggressively thinking people of this country as any other institution. It teaches, leads, develops the ideas of prospective teachers who go out among the people and have a large part in shaping the ideals and the habits of our people.

A few particular fields of instruction in the teachers college are in a favorable position, because of the stress of war activities, to point out at this particular time ways in which our thinking, our habits, and our economy are likely to be readjusted if we are to secure the maximum benefits from our war experience and from the peace after the war is over.

In this bulletin the President of the College, six heads of departments, and a member of a seventh department have pointed out some of the readjustments that should be made, some of the fields of activity into which we shall find it profitable to delve deeply as a result of recent events, and some of the principles that should guide in the inevitable changes.

HOWARD J. MCGINNIS, *Chairman*
*Publications Committee*

August 1, 1943.

# PUBLIC EDUCATION AND DEMOCRACY

Dr. Leon R. Meadows

For almost two centuries the people of the United States have lived under a democratic form of government; we have come to accept this democracy as being one of the things which is vouchsafed to us; we give it little more thought than we do the air we breathe, or the water we drink, and certainly not as much thought as we give to the food we eat. We simply take such a form of government for granted; we have had it all our lives; we have it now; therefore, we shall always have it. Today, we have almost forgotten, or at least neglected, to give due praise and honor to the forefathers who fought so valiantly that we might enjoy the privileges we possess. The distance is long between the suffering and hardship of pioneer days, and the comfort and convenience of the present; to the average American citizen it is difficult to conceive of a period without steam, without electricity, and without adequate means of communication and transportation, and all that these things mean to civilization; and yet, all these things have been purchased at great price, along with many others, and given us to use, just as if they had been bestowed upon us through the kindness of some beneficient god.

Recently, we have been shocked into a full realization of the fact that our democracy is not a gift, that it is something to be acquired, that it may be lost, and that it is now actually on the defensive. A quarter of a century ago it was freely stated that we were fighting to make the world safe for democracy; now, we admit frankly that we are fighting to save democracy. During this period, that is, the time intervening between World War I and World War II, few friends have been gained for the democratic form of government; some who adopted this form have overthrown it and are now working under an autocracy; others have made such changes in the operation of a so-called democracy that a new definition must be given the word to make it fit the form. The opponents of our own form of government do not hesitate to say that almost any kind of government will work in peace time, and when economic conditions are good, but, they say that we immediately turn to concentrated power, if not actual dictatorship, when we are engaged in war, or when we have any national calamity, such as a complete economic breakdown; as

evidence of this, they cite the fact that the President of the United States is practically a dictator in time of war, and that production is controlled by a central agency in times of economic disaster. The answer usually given to such criticism is that this is merely the way democracy works, and that such operation of our government may be changed by a vote of the people whenever the latter choose to do so. Such an answer is open to attack; most people believe that one person, backed enthusiastically by fifteen or twenty million armed men, could become a dictator in any country in the world.

What, then, shall we do toward the solution of the problem of saving and maintaining our democracy? We believe that the right education of all the people is the correct answer to this question. We have neglected education in the United States; we firmly believe that both world wars could have been averted through education. We have paid $5,000.00 a year to people whose sole occupation was that of training dogs; we have paid $10,000.00 a year to horse trainers; and we have paid $900.00 a year to people who have been in charge of America's choicest possession, our children. Professions, which are more lucrative, are attracting many who should be teachers. The teaching profession should have in it not the second best, but the best minds of the country; a teacher of youth should be familiar not merely with local problems, but with national and international as well. The training of such a teacher requires effort, time, and money; if such an investment is to be made, there should be promised ample compensation at the close of the training.

A democracy must be built upon an educated citizenship; a person is compelled to have the ability to think, if he is to make the proper use of his privilege of voting. There are still with us many who believe that the chief purpose of education is to teach people to think; that formal college training does not always accomplish this purpose; that many gain the power without formal education.

Self-discipline is a necessary factor in a democracy; there is too often a tendency to throw all restraint to the winds; freedom, of which we boast, is interpreted to mean license, and the latter, uncurbed, may lead into all sorts of difficulties. For a successful democracy, it is essential that people learn to obey the laws and regulations which they, along with their fellow citizens, have passed. Horace Taft says: "Obedience is important, and it is more important in a democracy than in any other kind of government. If the minority does not loyally and heartily obey the

government, but feels entitled to discuss and even disobey any decisions of which it disapproves, democracy becomes chaos. What kind of training can there be, if children do not learn and practice obedience to proper authorities? This democratic life of ours involves many things, among them cooperation, self-government, obedience to authority, the doing of much uninteresting drudgery, and so forth. An education that combines these in proper proportion is what we should aim at. These are a large part of character building and the making of citizens. Steady discipline, which the students know to be discipline, is necessary."[1]

Participation in a democratic form of government gives people an opportunity to put into practice the principles which they have learned from texts and from other sources; in fact, unless these learned facts are put into practice they are of little value. Ample opportunity for participation in such matters may be found in the home, in the church, in the school, on the athletic field, and in various and sundry clubs and organizations; here, a person learns respect for law and order, as well as a regard for the opinions of others; here he develops a spirit of tolerance which can come only from association and work with others. John Dewey says: "A democracy is more than a form of government; it is primarily a mode of associated living, of conjoint communicated experiences. The extension in space of the number of individuals who participate in an interest so that each has to refer his own action to that of others, and to consider the action of others to give point and direction to his own is equivalent to the breaking down of those barriers of class, race, and national territory which kept men from perceiving the full import of their activity."[2]

During the emergency, while totalitarian governments are attempting, through poisonous propaganda, to influence all peoples against democracy, educational institutions should put forth every effort to keep alive in the minds of all the spirit of liberty and freedom; no price will be too great for us to pay for the preservation of our democratic principles.

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1. *Memories and Opinions*, p. 245.
2. *Democracy and Education*, p. 101.

# IMPLICATIONS OF HISTORY

Dr. R. L. Hilldrup

If any indication of the future trend of social behavior can be secured from a study of the past, it is reasonably safe to predict that the United States will continue to act in the main, after the present war, upon motives of self-interest. As in the past, it is likely, also, that these motives of self-interest will be reflected in the curricula of our educational institutions. Those American educators in the public schools, in particular, who are inclined to identify our national self-interest with considerations of immediate expediency will probably advocate, with greater vehemence than ever, the teaching of courses in contemporary social problems, current events, and panaceas of social ills to the exclusion of a formal and sustained study of ancient, medieval, and early modern history. Such educational conduct is in harmony with the spirit of revolution; and the world is now in the throes of one of its periodic revolutions.

If this revolution produces a world federation and a large segment of American opinion is pleased with it, many educators will probably attempt to offer an unusually large crop of courses on World Federations, the Good Neighbor Policy, Internationalism, Human Equality, and the like. In that case, it will be the duty of the history and social science departments of teachers colleges to furnish these educators with sound historical facts and principles of social behavior that pertain to these fields. Else their instruction will rapidly degenerate into a hodgepodge of euphonic platitudes and wishful thinking.

If, on the other hand, international security is not established and the United States should become convinced after the present war that its self-interest and security can be promoted best by a stronger national policy, many educators will be equally ready, no doubt, to offer courses on the advantages of militarism, economic autarchy, and national imperialism in which neo-mercantilism, rationing for national power, and novel forms of collectivism will be extolled. In such circumstances the teachers colleges should try to prevent nationalism from becoming a Moloch, with teachers of the social studies as his high priests; children, his willing sacrifices; and history, his theology. Whether or not the colleges will have the courage and ability to

withstand such a trend is a serious question, not easily answered. They are a part of the educational system of the nation, subject to the same influences, to a great degree, as the public secondary schools. It is obvious that should they lose their academic freedom, they will not be able to do any thing along this line.

Perhaps, after all, teachers colleges will not be faced with extreme internationalism or extreme nationalism after this war. Revolutions seldom achieve clearly defined results, for peoples are inclined to slip into some sort of workable compromise, lying somewhere between the extreme ideologies of the contestants, once peace has been restord.

In revolutionary epochs people are tired of traditions and restraints. They are in no mood to learn the lessons of history. Their mood is being expressed educationally, at present, by the teaching of many courses as history and social science which are not rightfully either, but attempts to draw blueprints for social engineering. To offer such courses to immature students before they have gained perspective through a study of history; a knowledge of the laws of society through a study of the social sciences; and an acquaintance with human nature through psychology and experience is to put the cart before the horse. Such a procedure is as ridiculous as to teach students the intricate processes that will be used in industrial chemistry twenty years hence before they have had a single course in the elementary principles of chemistry. Naturally such courses on the secondary level tend to degenerate into a cheap propaganda, characterized by much heat but little light. They upset the emotional stability of the immature student; form within him the habit of acting on inadequate, and often biased, information; and make him a likely victim of the first cheap politician who comes along with a messianic message. Against such perverted educational practices teachers colleges should take their stand now, in very definite ways.

They should recognize courses in social engineering for what they really are. They should not be fooled by nomenclature into giving credit in history for them. Properly conducted courses in social engineering for mature students of college or university standing are greatly needed—and the teachers colleges can help to direct education greatly along this line—but they are neither history nor social science. They are courses which Plato would have reserved for his young philosopher-statesmen after they had become acquainted with the truths of history, the social

sciences, and human nature. Teachers colleges can do no better, I believe, than to follow the advice of Plato in this respect.

History has a contribution to make to humanity that no other subject can make. To civilized mankind, in highly complicated and interdependent societies and cultures, its contribution is well-nigh indispensable. An understanding of the ideals, traditions, thoughts and patterns of behavior of other peoples, with whom we must deal, can be acquired, if at all, only through intensive courses in history, in which a student forgets for the time being in so far as possible his own cultural predilections and prejudices and brings to bear upon his problem all pertinent knowledge concerning man in society that has been discovered by the social scientists and the psychologists. This is a difficult assignment to be sure; but there is no royal road to understanding man, the most baffling enigma on Earth. Yet social engineers must have this data if they would build anything less harmful than air castles. Without such information, they are more likely to propose systems that will produce only tears and death.

The present conflict has shown that the American people are woefully ignorant of certain fields of history. A surprising number of college graduates have never had a genuine course in the history of their own country. This may account in part for a certain pharisaical Fourth-of-July sense of superiority over breeds of men who have not been wise enough to adopt our democratic principles and republican institutions. Moreover, Americans frequently act in their foreign policy as if they suppose all the peoples of the world really want democratic government and peace at all times.

This pharisaical spirit and these erroneous assumptions are due also, in part, no doubt, to a lack of an understanding of the history of other peoples. All too frequently European history has been studied only to ascertain the heritage which the United States has obtained from Europe—and not for the purpose of understanding Europe itself. Moreover, we know now that too little attention has been devoted to the history of the Orient and of Latin America. Already our people are realizing that the interests of the United States are frequently as closely bound up with the affairs of Latin America and of the Orient as with happenings in Europe.

Unfortunately a spirit of intolerance arises in wartimes which prevents historians from entering objectively into a study of the course of affairs in an enemy nation. Should one attain a degree

of impartiality and attempt to present the principal ideas, social forces, and events which brought an enemy nation to its present position, likely as not he is accused of trying to justify the conduct of that nation and of being disloyal to his own nation. Herein lies a two-pronged obligation of the teachers colleges. One, to teach in wartime as well as in peacetime that the historian is interested only in explaining and interpreting ideas, social forces, and events, not in the justification of any person, nation, idea, or thing. The other, to redouble their efforts now and after the war to accumulate and present to prospective teachers, in a fair and impartial manner, historical data on enemy nations. If students learn how other nations get into lamentable pitfalls, they may be able to prevent their own nation from falling into the same pitfalls, or, from pushing other nations into them. To allow courses to degenerate into nothing more than the Damning of Hitler and Japanese Perfidy, even in the disguise of educating for victory, is worse than offering no course at all. Such misinstruction is the dragon teeth of future misunderstandings.

It seems likely now that the present war will strengthen a change of emphasis in the teaching of history which had begun before the outbreak of hostilities. If the trend toward collectivism continues for a time—and it has certainly been stressed by the war—less will be said about individual rights, even in secondary schools of democratic America. Instead, more time will be devoted to a historical study of schemes of price fixing, social security, planned economy, and the like. Crop control, governmental regulation of money, public works for the unemployed, and bread lines were already ancient social phenomena when the Star of the Christ-Child shone over Bethlehem. Already striking parallels have been drawn between the program of the Gracchi and the New Deal. Social and cultural histories, with stress on collectivism, are being emphasized greatly in many quarters and will probably become more widespread during the next decade.

As trainers of teachers and students of psychology, acquainted with various methods of teaching, the professors of history in the teachers colleges should have a greater share in the rewriting of the postwar textbooks in their field. Research scholars do not necessarily make good textbook writers, particularly when teaching is not their primary interest.

This should not be taken to mean that historians in teachers colleges cannot profit from engaging in research work. Far from it. Original documents help to keep the history teacher's feet on the ground. Every prospective teacher of history who graduates

from a teachers college should be made thoroughly acquainted with the most reliable sources of information in his major field. There is no better antidote for nebulous thinking on his part than reference to such source materials from time to time.

Professors of history in teachers colleges must necessarily spend most of their time in actually teaching subject matter; but their work is not done unless they have taught their students to use source materials critically and intelligently—not, necessarily, that their students may become profound research scholars, but in order that they may retain a sane balance and perspective and secure information from the most reliable sources in revolutionary epochs of many ill-conceived theories.

Should, by any chance, one of these students develop into a research scholar, no harm will have been done. After the present war there will be whole new fields for historical research still untouched. Both the teaching historian and the research historian should have a hand in the construction of historical works. Hence, teachers colleges should welcome, impartially,—and many of them do—, the contributions of both, striving to bring about a coordination of their efforts so that the educational world may receive maximum benefits from the talents of both. In the revaluation, re-interpretation, and rewriting of the histories of the postwar period American scholarship is not going to have any talents or strength which it can afford to squander on the use of obsolete methods of distribution. The teachers colleges should become clearing houses for the organization and presentation of the fruits of genuine research to the prospective teachers of the public schools in such a way that they can popularize them and present them to the people of all communities when such knowledge will make them better-informed citizens of the nation and of the world.

# OUR CHANGING GEOGRAPHY

Dr. Parnell W. Picklesimer

## Inadequacy of Geographical Knowledge

This is a period in which great changes are taking place. This is notably true with respect to geography and its bearing on the present war. It is primarily the function of geography to assist in educating people to better ways of living. But this field of knowledge has been rather slow in rising to its rightful position of prominence in the school curriculum. This is partially evidenced by the fact that there are still a good many people living in the United States who believe the earth to be flat. Moreover, Dr. John W. Studebaker, United States Commissioner of Education, says: ". . . aside from rather backward nations, we are more illiterate geographically than any civilized nation I know." The question naturally arises, Why such a condition? Geography is not rationed; and, if it has a contribution to make to American education, its assets must not be allowed to freeze. It is only recently that educational leaders have become somewhat alarmed at the geographical backwardness of our people. Now they call for more and better instruction in the science. Both teachers of geography and curriculum makers are charged with the responsibility of answering this call. The time has come when a young man or young woman cannot move with ease among groups of cultivated people without a knowledge of geography. Unfortunately, the present supply of adequately trained geography teachers for civilians is temporarily limited. Within the last two years our colleges and universities have lost many of their geography teachers—individuals who have been inducted into the armed services of the country because of the rising need for their specialized skills. Into the federal bureaus and departments in Washington alone have gone some two hundred of these people to assist in the war effort. Geography is today one of the priorities in education and, as a field of usable information, is becoming more and more subservient to the state. But the geographer is no crusader on a white horse; the facts and relationships of his science are clear-cut, and are available for human consumption. As a people, we have no other alternative but to learn and accept

them. To some people such a statement may appear to be carelessly made, but it will withstand close scrutiny.

### Geography in the Air Age

We have too long had the feeling of smug security in our democratic way of life. We have been reluctant to admit that isolationism as an American issue is dead. It is necessary that we keep our approach to each new era of study fresh and vital. Now, as never before, it becomes essential that students gain a global concept of the earth; that they understand fully the meaning of "great circle routes" and something of the distances between cities and continents. We are now living in an air age and, while our age has not matured, it is growing rapidly. Our people must be trained to think in terms of this age. As a people we run about a great deal, yet many of us have difficulty in intelligently interpreting maps, or finding the shortest distance to our fighting fronts. Most people are probably unaware of the fact that the shortest distance to some of our far-flung battle fronts is by way of the Arctic. In fact, until recently the ice of the Arctic regions barred direct or great circle transportation. The newer routes will not only be shorter but will often reach parts of the world which have valuable resources accessible only to the airplane. In Columbus' day three months time was required to cross the Atlantic, but only recently the journey was made by plane in slightly more than six hours. The indications are that air lines will soon bring all the world within a day's travel. Although the plane is of great value in waging war, it is to a large extent revolutionizing transportation of people and high-valued cargoes. It is interesting to compare routes used for travel by air with those used for ocean travel. For example, the shortest air route from New York to Darwin, Australia, passes through Alaska. Seattle is a way station on the shortest route from the Panama Canal to Tokyo, and Denver lies very close to this route. The air route from New York to Rio de Janerio is only 4,750 miles. The saving in distance between these points by air as compared to ocean routes may be easily visualized through a few simple measurements on a good world map. The establishment of air routes, the location of great landing fields, and the character of cargoes are all problems of the new air-age geography.

### Geographical Study Stimulated by War

Every citizen is now interested in maps and descriptions of remote and little known places that have suddenly become of

strategic importance to a world at war. When our armed forces invaded North Africa they took with them 110 tons of maps. They found this amount to be inadequate and sent back for 400 tons more. There is also a rising curiosity about geographical knowledge on all our fighting fronts. Do you realize that, strategically, Tunisia is more European than African; that North Africa is not a region of drifting sand dunes; that floods occur there so excessive as to destroy human life and property; and that there are cities two or three times as large as any in North Carolina? Do you further realize that in this same region winter is the season of green and growing vegetation, and that the climate is similar to that of California, where many of our people go for their health and for retirement during their declining years? Do you know that Attu Island, within a few hundred miles of Japan, is the source of weather variations in the North Pacific; that the Japanese, by taking the island, knew not only what the weather conditions were there but what they were going to become in all the Aleutians, while the westbound Americans did not? From this factor alone Attu is of great strategic importance to America.

It is unfortunate that a World War is required to awaken the American press suddenly to a realization that maps can illuminate the events of the day in a more effective way than any other single mode of expressing environmental relations. Place geography, in some respects, is more important now than ever before. Such names as Guadalcanal, Coral Sea, Casablanca, Dutch Harbor, Attu, and Pantelleria were unfamiliar to most people before our entrance to World War II. The exigences of war resulted in the construction of the Burma Road and the Alcan Highway, as well as many other less publicised roads. Airplanes are delivered to battlefronts by being flown to England, to Egypt via South America and the Sudan, to Australia and even to India and China. In emergencies thousands of troops, together with their equipment, have been delivered quickly by air. This was admirably demonstrated by the Allies in their final attack on the Axis forces in Tunisia. But geography is much more than a study of location, distance, and space. In time of war it is important to understand the strength and weaknesses of the enemy and the apparent reasons for attack. Geography involves also a study of land forms, especially configuration of the coasts, and the climatic variables. It includes a knowledge of population, together with the training and capacities of peoples; a knowledge of their food supplies and food potentialities; and information concerning the

sources of minerals and other critical raw materials. The Axis forces were able to forge ahead across the plains of Russia, but were slowed up and held in check in the Caucusus Mountains. The British Eighth Army chased Rommel a thousand miles across the plains of Africa, but the final victory was delayed when mountainous territories were encountered. Each time enemy warships find shelter in the protected fjords of Norway we sense anew the importance of land reliefs. Enemy seisure of blankets in Norway and food supplies from the people of Denmark, Holland, France, and the starving Greeks; the fight for oil and rubber; and the rationing of food in America, bring home to us the importance of agricultural and other raw materials. Thus remarkable changes in trade and industries have come both to our own country and abroad as a result of the occupation of lands by aggressor nations and the necessity for defense programs. America's total defense participation in the present global war constitutes in itself a most convincing argument for the need of an intensive program of geographic education. This is notably true in the field of industry.

### Changes in Industry

Today the geographer observes the changing industrial map of America. And along with it come changes in business control—for the government owns most of the new factories. The federal stake in industry now amounts to some $14,000,000,000. These projects, for example, produce more aluminum than all the private companies put together. The Defense Plant Corporation of the government has built and equipped 1022 plants in forty-three states, and is building 457 more. This agency works like a mammoth bank, producing airplanes, arms and ammunition, radio and communication equipment, machine tools, ships and ship parts, iron and steel, synthetic rubber, etc. Private industry is, for the time being, greatly overshadowed by the government's effort to meet the emergencies imposed by war. Along with this change, the scourge of unemployment has been completely wiped out.

### Influences of Science and Technology

Much has been said of man's conquest in industry and war through developments in science and technology. In two years a great synthetic rubber industry has been built that could not have been set up in half a century of peace. War's plastic achievements are numerous. Already more than two hundred airplane parts are being made from plastics. The shortage in

quinine is being met by the discovery and development of synthetic substitutes. In most cases the war has been the great stimulator.

Today the aerial camera ranks in importance with the tank in changing the tactics of modern warfare. Hours before our bombers raid Axis centers planes equipped with the latest photographic devices cover the area to be bombed. Pieced together on a large map the pictures taken dictate the route our bombers shall travel, the speed and altitude to be maintained, and the size and number of bombs to be carried to the enemy. Photographs are often taken through thick fog on the darkest of nights. They detect the smartest camouflage schemes and reveal the height of buildings or the depth of a trench—accurate to within a tenth of a foot—from altitudes as great as 37,000 feet. We are told that the best photographic effects can be secured after sundown, and these are not limited to the black and white types only. After the pictures have been taken, developed aboard the airplane on the return trip, they are immediately turned over to other technicians who plan and direct the bombing expeditions. This type of procedure saves much time and loss of materials and equipment, and enables bombers to drop their cargoes of destruction directly upon the target.

From a strategical standpoint, our armed forces have also been enriched by the invention and development of **radar**, a weapon that is only second in importance in waging war to the airplane. The public is not in possession of all its secrets. Many of its critical facts are securely locked in files. In brief, radar appears to be similar to a searchlight, the beams of which are not illuminated. These beams scan the sky and sea with sharply focused ultra-highfrequency radio waves. When these waves strike an object they are reflected. The distance is determined by the length of time required for the rebound, and the object can then be "seen" by means of a radio receiver which is carefully and properly tuned to pick up the reflected signal. Radar has been used against the enemy for many months, and is probably more responsible than any other single factor for saving England when her people were almost beaten to their knees by the German Luftwaffe. The press reported that British pilots and gunners were being fed carrots to improve their vision, but the truth of the matter is that radar was being used to detect the German raiders almost as soon as they left their bases. When the Germans arrived they found the Royal Air Force aloft and waiting for them. A radar instrument can detect not only the

presence of an enemy plane or ship but can also determine its direction and distance. The instrument can be made to accomplish these feats in total darkness with the speed of light, and enable gunners to aim accurately and shoot down enemy planes above the clouds. Through the medium of this detective device naval guns can accurately place their shells on the deck of an invisible ship at sea, or engage in successful combat in total darkness. Radar has played a far more important role on our battlefronts than most people are aware. Moreover, along with the changes resulting from the development of radar and aerial mapping are many others in the field of geography.

### Geography Not Static

Geography is not a static science. In a changing world some centers will take on a new importance while others may become less important. For example, Kimberly, of South African diamond fame, has become a ghost town as men have gone from the mines to serve with the armed forces. The diamond cutting centers of the low countries of Western Europe have recently relegated first place to New York City. Today the Argentine railroads are being compelled to use corn for fuel. At present there are more windmills in England than in Holland. Some years ago the Chicago River was turned around and made to flow in the opposite direction. In general, the passing years bring changes in the demand for particular commodities, and these changes are reflected in the expansion and contraction of producing areas. New machines and processes upset the established order and usher in new ones. Such changes, however, must work within the limits imposed by the natural environment.

### The Outlook in Geography Teaching

There is no doubt of the rising interest in geography. The process has been slow, but time will gradually clarify its findings, correct its errors, and consolidate its positions. Conclusions already reached are beginning most hopefully to redirect education. A new concept concerning the field and function of geography is gradually developing in the minds of an increasingly large number of people. In time we shall doubtless, and probably at great cost, learn to use our gradually accumulating experience in wiser ways for a finer good.

# SOCIAL AND POLITICAL RECONSTRUCTION

MARTIN L. WRIGHT

In answer to your request for a statement of post-war aims in teaching the social sciences, I can think of no higher aim than good citizenship. The **Twelve Year Program,** issued by the North Carolina Department of Education, 1942, carries what I consider a good statement of aims and methods in this field. I am therefore quoting at length from the above mentioned publication.

I. GENERAL STATEMENTS.

A. The social studies include those materials in the curriculum which are drawn from the fields of history, geography, economics, sociology, political science, psychology, and ethics. They permeate all fields of the curriculum and are therefore one of the richest sources of materials for the child's program. Some of the most effective integrations of learnings take place in the development of social studies units of work. For example, many valuable language arts skills emerge from the reading, writing, and speaking needed in studying a social problem.

B. Chief among the values which the social studies contribute to the individual and to the school program is the development of the ability to meet situations involving social relationships. Self-dependence in the location of information and power in reflective thinking are outcomes made increasingly important by rapid social change and the continuous emergence of novel and complex problems. A sense of continuity, including time concepts, a sense of evidence as a basis for reasoned conclusions, and a sense of tolerance are essential values to the pupil. Further values derived from the social studies are the development of historical mindedness, a sense of the interdependence between man and his environment, the development of space-place relationships, and the development of the quantitative way of thinking.

C. Democracy is the fundamental pattern for group living in America and should receive practical emphasis in the social studies program. The school organization and general set-up should provide opportunities for children to

live in a democratic way. This can be accomplished only when pupils take part in planning and carrying out school activities of all kinds.

D. A major objective of the social studies program should be the development of fundamental concepts concerning the economic, social, and cultural life of the people through exploring the community as well as other sources of information.

E. The social studies program should begin at home. A study of the immediate environment and of the State in general is relatively more important than an intimate knowledge of places far away, both with reference to time and geographical location. Hence, it seems desirable to emphasize the contemporary and the immediate, giving them more meaning by reference to the past and the far away. Expansion of the fundamental concepts developed in the study of the local community makes possible a better understanding of national and international problems.

F. Throughout the social studies program in high school as well as in elementary school, every effort should be made to relate the work of the various courses to North Carolina, even though one year has been designated particularly for the study of the State and its interdependences. For example, the Boston Tea Party should be compared with the Edenton Tea Party and this whole movement against the abuse of the colonies by England should be interpreted in terms of its effect upon our ways of living. Likewise, the study of the Industrial Revolution will have more meaning for high school pupils if it is approached from an angle which shows its effect upon the rise and development of industry in this State. In other words, the Industrial Revolution as it emerged in England should be studied as a background for the Industrial Revolution that really got under way about 1880 in North Carolina.

G. The social studies program should be made dynamic and vital in the everyday living of youth. To accomplish this the school must lay greater stress upon those experiences that will be most meaningful for the average student. However, the experiences which are fruitful for one person are not necessarily helpful to another. Therefore, a variety of experiences should be provided for through the use of basal and supplementary texts, libraries, magazines,

pamphlets, school news weeklies, maps, charts, lantern slides, motion pictures, dramatics, construction work, and excursions into the community.

H. A school approach to the social studies from the first to the last school year is desirable. The life of the school with its typical items of planning the school day, electing officers, hearing committee reports, issuing the school newspaper, and participation through the school council is a vital part of the social studies curriculum. Problems should be set through cooperative planning and social studies materials should be assembled to help solve them. Teachers should feel free to arrive at solutions either through logical arrangement or through a child-community-interest organization or through both. Materials from all fields of the social studies (history, geography, economics, sociology) should be integrated to furnish complete understandings.

I. Children often wish to repeat pleasurable experiences, and that is desirable provided variations are made so that additional valuable learnings are gained each year. It is not desirable, however, to make almost identical studies of such topics as the Pilgrims, or transportation, in successive years. Each year should show growth in social understanding.

## II. CONCEPTS AND GENERALIZATIONS.

There is general agreement that the following generalizations are important for a social studies program in a democracy.

There are, of course, countless other equally valuable generalizations that pupils will develop during twelve school years. This random selection, the sources for which cannot be given accurately, is placed here merely to suggest to teachers what kind of understandings might finally be expected from pupils if the social studies program is adequately developed.

1. Man's conception of truth changes.
2. Social changes have traceable causes.
3. Man is a social being and needs contacts with others of his kind.
4. Nothing runs into the present without pressure from the past.
5. Man is an individual and as a member of various groups is increasingly dependent upon others.
6. Physical environment affects and is affected by man.

7. Freedom is enjoyed through the exercise of intelligence and the assumption of responsibility.
8. Conditions of living are being constantly made better.
9. Understanding that men are alike in fundamental respects is basic to improved human relationships.
10. The existence and progress of man are dependent upon his adaptability.

## III. ABILITIES AND SKILLS.

Each year from the first through the twelfth should see an appreciable growth in most of the following skills. Some items would have later beginnings than others. Local teaching groups might indicate the year in which certain items would receive particular stress and in which practical mastery would be expected from the average pupil. By the end of the twelfth year all pupils should be well along the way toward mastery of all the skills and abilities listed.

1. The development of good study habits, such as beginning a job promptly, listening to and understanding directions, concentrating on the work at hand, and having a plan of work.
2. Ability to do critical reading, interpret data, compile bibliographies, and make a report, oral or written, upon the problem studied.
3. Ability to use a social studies vocabulary.
4. Ability to evaluate sources of information and to recognize and analyze propaganda.
5. Development of time and place orientation.
6. Ability to use and interpret materials, such as maps, globes, slides, relics, newspapers, observation trips, and information gained from interviews and discussion.
7. Skill in the use of numbers in such activities as making personal budgets, community surveys, reading and making graphs, and interpreting social statistics.
8. Skill in obtaining pertinent information from current periodicals.
9. Ability to take part in orderly exchange of opinions, with respect for the opinions of others.
10. Ability to use a variety of means of expression, including language, paint, crayon, paper, wood, clay, and the like.

I should like to quote also from an article in the July issue of Fortune, entitled, **Ferment in Education.**

> If one of our aims is to produce graduates zealous in civic affairs, we shall wish them to have at least a minimum sense of values. It is not, of course, wise to confront students with a precise and full-blown system of values; values should not be exclusively Aristotelian or Neo-Thomist; they should not be a matter of any particular selection of 100 great books. Our age is searching for truths it has not found; it is idle to suggest that there is widespread agreement on what the true values are; it is dangerous, in the absence of agreement, for the educator to train minds to think the way he thinks. But it is important that the student become aware that life is a matter of more-than-personal concerns; and it is essential to the democratic idea that the student see clearly the dignity of all other human beings and that he treat them as ends, not as means.
>
> The schools, in their confusion, are only the reflection of the confused life around them. They are of society, not above it, and their aimlessness is the aimlessness of today's ever changing world. Americans are clearly presented with a choice. We can adapt students to this world; we have been doing it for some time. Or we can consciously and deliberately make our schools more vital and creative, to the end that our children go beyond today's confusion and understand it better than we do ourselves. This course, more difficult, is the way of heartbreak and of tears. For it may well produce humane and thoughtful adults who, dissatisfied with the life they see, will want to better it. But it will produce adults. A streamlined adapting of children to our present world will only produce adolescents whose dissatisfaction is inhuman and whose only course of action is aimless violence.

# HEALTH AND PHYSICAL EDUCATION FOR A STRONGER NATION

Dr. F. P. Brooks

American youth is not physically fit! Such a conclusion is inescapable from the evidence accumulated from the draft examinations. Twenty-five percent of the white boys between the ages 18 and 19 were rejected; while forty-five percent of the Negro boys of that age were rejected. Of the first two million draftees examined before Pearl Harbor, approximately one million, or fifty percent, were rejected as being physically or mentally unfit for the armed forces. The same convincing evidence comes from the examination of students entering one southern college, which revealed only twenty-six out of two hundred and eighty students examined who did not show one or more important correctable defects. A similar conclusion comes from the North Carolina State examinations of high school seniors in 1942.

But this fact of physical unfitness is not the only conclusion which must be reached. Even a superficial examination reveals that our high school students are not adequately informed relative to health matters, personal hygiene, and health practices. Their attitudes toward physical well-being, the correction of physical defects, and protection against communicable diseases is deplorable.

Where does the blame lie? To this there can be but one answer. It lies in the school systems of the various states. All responsible organizations interested in health or in education and child welfare have placed health and physical education as the most important objective in every program set up in the past ten years. Everyone recognizes the need, but in spite of this the inclusion of instruction in health and physical education in the curriculum in adequate amounts of time, and under adequately trained personnel is far from universal. So far, the established subject matter fields in the curricula have consistently refused to make room for these newcomers.

What is the general attitude toward physical education? The emphasis has been placed almost entirely on competitive athletics, engaged in by only a small part of the student body. Accordingly, the physical education director has been selected largely

for his ability as a coach, and for his success in turning out successful teams. This has made his interest center largely in the developing of winning teams rather than the physical fitness of the whole student body.

Similarly the teaching of the few required units in health have been for the most part delegated to teachers totally uninterested in and inadequately prepared in the field of knowledge to be covered. Is there any wonder that the graduates from such schools are ill prepared?

How can the situation be corrected? Not until adequately trained teachers are available to carry on a program of health and physical education in every school. This training of teachers is the problem of the teachers college.

Four years ago the North Carolina Board of Health and the North Carolina Board of Education recognized the problem of inadequate instruction in matters of health in the public schools. Under a five-year grant of funds by the General Education Board of the Rockefeller Foundation these two boards set up the School Health Coordinating Service, with a specialist, Dr. Walter Wilkins, as coordinator. This Service studied both the health status of North Carolina children and the matter of health instruction in certain selected counties of the state, and soon realized that the fundamental cog in the machine of health instruction in the public schools is the grade teacher in the lower grades and the specialists in these subjects in the high schools. Their second conclusion was that progress would be more rapid and more certain were all new teachers required to have special training in the teaching of health and physical education. It was recognized that in the high schools the instruction in both fields fell to the specialists, so the requirements for certification as primary and elementary teachers were set up calling for nine quarter hours of college training in these subjects. For the certification of specialists in health and physical education adequate preparation in these subjects were set as requirements.

Thus the job of the Teacher Training College shapes up as follows: First—It must offer the required courses for the certification of teachers in primary and elementary fields in the region of health and physical education. Second—It must offer courses necessary for its majors to meet the requirements for certification as specialists in health and physical education. Third—It must take all its students and examine their health status and endeavor to correct all correctable defects; that is, it must provide adequate health service to all students in college.

It must provide an environment of healthy school living through adequate nutrition, adequate lighting, safe and sanitary buildings, adequate recreational facilities and opportunities, and satisfactory emotional conditions.

It must provide instruction in matters of health and physical education not only to correct the deficiencies of previous schooling, but in order to develop leaders in matters of health and recreation for local communities. Fourth—It must establish in these "Teachers to Be" habits and attitudes which will carry over into the every day practices of their lives and which will become an integral part of their teaching through example as well as precept.

Perhaps with these objectives well accomplished, we might be tempted to pat ourselves on the back and say "well done," but the job doesn't end there. At the average rate of replacement of teachers it will be twenty-five years before our schools will be staffed with teachers of even this degree of training. We can not afford to wait twenty-five years to institute a sound program of health and physical education. The need is now. The demand for action is now. Everywhere public sentiment is receptive to health and recreation programs as is shown by the popularity of the Victory corps which gives a strong motivation to the program and demands, immediately, leaders to direct and develop this vital phase of education among our people.

There are two ways in which this hurry-up training can be provided. One is by special summer courses in colleges prepared to offer them. These opportunities are being provided now by summer courses through a variation of the content previously incorporated in these courses. But this method of summer study calls for the expenditure of both time and money by teachers for work which in most cases will not in any way improve their earning capacity through certificate change. It is a foregone conclusion that only a small group of experienced teachers are going to adopt this method of securing the necessary training.

The other method is that of in-service training. In those schools in which the administration is willing to insist that the older teachers also prepare themselves to teach health and physical education, in-service training by means of a series of lectures, demonstrations, etc., offers the best method of quick training and one which can be made very effective. This plan requires the services of some one already trained who can give the needed information and stimulate and guide in developing the program.

If such a trained person is not readily at hand, then the administration is obligated to see that one or more of its teachers or administrative officers is sent away to get this special training. To facilitate this, the School Health Coordinating Service offers scholarships paying a large part of one's expenses at one of the Child Guidance Clinics which it conducts at several places in North Carolina each summer.

Here again the teachers college can fill a very real need either by setting up a summer school program especially designed for the training of these specialists, or by sending out to the schools during the regular session capable instructors to operate the in-service classes of the various public schools. Where distances to be traveled are not too great the in-service plan offers perhaps the greatest degree of help in furthering the program, in that better trained and probably more interested persons would be doing the instructing.

The resident service of a well trained person in this field would, however, be more advantageous than would periodic or irregular short training classes of highly trained specialists. The resident instructor in physical education would not only be present to instruct classes but also to advise and direct plans and activities of other teachers assisting in the health and physical education program.

In summary, then, the function of the teachers college in the health and physical fitness program which is evidently needed now and which will be indispensable in the reconstruction after the war is, first, to devote a fair part of its required curriculum to health education and physical education, to teach all its students so intensively and so extensively as to develop in them health knowledge, health habits, and health attitudes, and to equip them to teach the fundamentals of health and physical education; second, to offer in summer sessions, courses in health and physical education so as to enable older teachers to acquire the necessary knowledge and skills to teach these subjects; and third, to promote in the public schools in-service training of teachers both by training specialists to operate in-service training programs and by furnishing visiting specialists to conduct in-service training programs.

The fields of health education and physical education are not new but they have been inadequately developed. It is high time that they be given the intelligent attention and direction they deserve, for our personal and for our national welfare.

# HOME ECONOMICS AND POST-WAR RECONSTRUCTION

KATHARINE HOLTZCLAW

In war or peace, the American home is the unit on which, and of which, our civilization is built. Whatever changes occur, and whatever conditions exist, it must remain the chief training institution for our future citizens—the center from which mental, physical, social, and spiritual development begins, the place which symbolizes, to most of us, our country. Since home economics is that part of our educational program which deals directly with the information, appreciation, and skills of homemaking, a large share of responsibility for keeping the American home as a desirable educational unit rests upon the teachers of this subject. This not only involves the training of the future generation, but must, in order to create the right ideals in our citizens-to-be, concern itself with present problems which are today facing the adult members of the families of our nation, and which will be increased when the present emergency is over and post-war readjustment comes.

The first step in this preparedness program has already been taken. Those who teach homemaking are earnestly seeking to determine the real and lasting values that will furnish a basis on which to build, no matter what takes place in our changing world. The subject matter which seems to emphasize these values is being stressed today and will carry on and be added to as developments occur and as our view of future needs becomes clearer.

For example, a more serious emphasis than ever before is being placed upon management of income. The planning for financial expenditures and the carrying out of plans have become an important patriotic duty. In this planning, an allotment is made for the necessities of life—food, shelter, and clothing; then comes the apportionment for war bonds and stamps. To check on this plan and its efficiency, simple account-keeping is necessary. Home economics teachers are realizing that few homemakers will do complicated book-keeping; so it is necessary to develop simple and easy systems which will take little time, will tell accurately the facts of spending and may be adapted to various individuals and families. Hand in hand with the making

of the budget goes the problem of wise buying. In order to train for spending to the best advantage, courses in consumer education are being taught. Along with the theory, as much practice in buying as possible is being given. Whenever anything has to be bought for the home economics department or for classes, teachers are seizing the opportunity to let students have this practical experience. With present restrictions, a realization of the importance of the conservation and preservation of all materials has developed. This refers chiefly to food, clothing, and household equipment from the homemaker's standpoint, though at least one course which is at present being offered to women deals with the care and repair of automobiles. Since women do more than three-fourths of the spending done in this country, no time used in learning to plan, buy, or care for purchases is lost.

With the evidence of mal-nutrition brought out by the physical examinations given the young men of our nation, has come the recognition of the vital need for instruction in nutrition in a form which a layman can assimilate. Girls and women are awake to the need of learning to feed their families wisely, but they want and demand practical suggestions, not scientific formulas. So the chief change in instruction here is in the presentation of simple rules to aid in nutritious diets for the family group.

Home care of the sick is also being stressed, and equally with this, the more important side, keeping the family well. With the large number of doctors and nurses required for work with our armed forces, the need for a knowledge of home nursing and simple health rules is evident.

Pre-school education has also gained some momentum in recent months, and along with the nursery school goes parental education in the form of child care and training. Nursery schools have been established in order to supervise children whose mothers are doing war work of various kinds. With the child away from home for a large part of the day, it is more essential than ever that the parents understand the physical, mental, and social needs of children, so that during the time when they are at home, these needs may be adequately met. A nursery school supplements home training, but does not make the home less necessary.

Vocational guidance for youth is recognized as a definite need; and this enters into the home economics program especially, because of the more informal teacher-pupil relationship which exists in such classes.

The value to be derived from all the foregoing phases of home economics have long been known to the leaders in the field. The added impetus has come from the fact that educators, parents, children, and the government are today recognizing the need for knowledge and training along these lines. So, we are making a start. Often times, however, the people who need to acquire this information and these attitudes are the last to be reached. In such a situation, the home economics worker must go to the people, not wait for them to come to her.

Post-war readjustment will involve many phases of human living. Of these, two seem of especial importance today. The first deals with the great scientific and technical developments which have come about because of the war·momentum. The second involves a more serious side, that of human relations.

In regard to the scientific and technical developments, we must begin now to prepare for such things as revolutionary changes in equipment, in housing, and in transportation. This may involve a complete reorganization of household work. All must learn, and help others to learn, to evaluate, use, and care for new commodities and materials as they are brought on the market. One result of these new articles, many of which will be designed to save labor, will be a still greater amount of leisure, and using this free time to advantage will present a secondary problem of no mean importance. Training for the development of interests or avocations in order that leisure time may be used wisely and pleasantly is a definite need. Thus with the benefits which will come from scientific inventions, will also arise difficulties and adjustments which home economics-trained workers can help the post-war homemaker to solve.

When we deal with material things, training seems not easy, but possible. If we seek to train for an understanding of people, with people, we face the hardest of all teaching tasks. Yet this education for an appreciation and understanding of human beings is vital to our civilization, or to any civilization which grows out of the one we have at present. Among these human problems comes first that of the reestablishment of homes that have been disrupted by the war. Here the youth of the nation will be greatly involved, though on the surface it appears to be a problem wholly for adults. The best preparation for such upheavals as will certainly occur is to teach the child to be open-minded, to be thoughtful, to weigh values, make considered choices, and be sensitive and appreciative of human frailties and loyalties. The

same preparation will aid in adjusting to any situation which deals with the broken home. Such situations will be brought about through casualties from the war or divorce which may result from changed interests due to long separations. To lend sympathetic understanding and to help the child or its parents face difficulties without bitterness is the duty and responsibility of any and all trusted teachers.

Unemployment, which is bound to be present after the war, presents grave difficulties. At a recent meeting of the Southern Regional Conference of Home Economics Workers the following statement was made: "From the standpoint of post-war employment, there may be at least 6,500,000 surplus workers whose continued employment will be uncertain. Of these two-thirds are women, most of whom are married." To meet this situation, first, guidance must be given in helping those trained in war work to find a use for those activities in time of peace; second, provision and training must be made for the development of satisfying avocations.

A more far-reaching human adjustment must come in thought and attitude. If our hopes and desires for a peaceful world are to come true, the individual, the family, and the nation must learn to think on an international basis. Love of country, or what we call patriotism, is no longer enough. We must train our citizens, young and old, to form opinions which will take into consideration not only a better state or nation, but a better world.

Training for these post-war adjustments cannot be given by home economics workers alone. All the educational and social institutions must lend their aid to help the families of America and of the world learn to meet their problems and make of their homes good living places for the citizens of our world of tomorrow.

# MATHEMATICAL INSTRUCTION AND THE NEW ORDER

Dr. Herbert ReBarker

At the time of Pearl Harbor mathematical instruction on a secondary level in the United States had reached an all-time low. Those interested in mathematical education at that time were put wholly on the defensive in its justification. All too often the zealous defenders, like those drowning, grasped at any straw of defense regardless of its frailty or inadequacy. Cries of "Come over into Macedonia and help us" echoed and reechoed from various educational centers devoted to the advancement and improvement of the teaching of mathematics. College campuses swarmed with freshmen many of whom had neither felt in high school the desire nor had the opportunity to pursue the study of mathematics. All the children of all the people were being educated. This being true, the colleges and secondary schools made the pathway to knowledge smooth and attractive for the neophyte by either simplifying the mathematics taught or else removing entirely from many curricula required courses in mathematics. To the special few remained the privilege of being led, as the general public believed, into the deep mysteries and overcoming the almost insurmountable obstacles of mathematics.

Many influences led to this waning of mathematical instruction. The nineteenth century had been devoted to the formal discipline philosophy of education and, although the opposition to this philosophy had materialized by the turn of the century, yet much of our educational thinking continued to be mightily colored by this idea. With the reaction to formal discipline, one of the strong forts for the justification of mathematical instruction was irreparably undermined. The determined adherence to an outworn, outmoded, and artificial organization of teaching material, in the face of well-established and accepted principles of psychology and education diametrically opposed to this type of organization, perpetuated an ever-increasing dislike for mathematics and a deeply-rooted mind set against it. The universality of the educational opportunity of the immediate past brought much opposition to mathematics, the subject universally thought of as a difficult one. The high fatality among students of mathematics in colleges and secondary schools led either to an extreme

simplification of the mathematics taught or to its abandonment. The American public, nourished on a diet of traditional mathematics, took very little or no thought of the value of mathematics in life, or its contribution to human progress. The professionally-trained educator generally had such a limited comprehension of mathematics and its value in modern civilization that he felt no hesitancy in recommending and even sometimes compelling less and less emphasis on mathematics as a school subject. The trained mathematician, trained for and in mathematical research to the neglect of mathematical education, quite often not only felt no need for the professional training, but was actually antagonistic to it, and displayed as classroom teacher an extremely poor grade of mathematical instruction. The crowding of the curricula due to the inclusion of subjects hitherto undreamed of as school subjects—some very praiseworthy, some indifferent, and some ridiculous—led to the abandonment of less attractive and traditional subjects. The age-old idea that the child should study mathematics for what it does to him and not for what he can do with it led to much confusion in educational circles to the detriment of mathematics. A constant accumulation of significant ills contributed continually to the decline of mathematics in general education culminating in the lowest ebb just prior to the present emergency.

The decline in mathematical instruction is often attributed to progressive education. This is a tacit admission either that progressive education predominates by force of numbers or that progressive educators wield a more potent and powerful influence on American education than do conservative educators who are in the majority. Less than ten percent of our public school system is administered and taught by educators who might be labeled as "progressives." A preponderance of the educational literature pertaining to the teaching of mathematics during the past two or three decades is reactionary in nature. A virile reactionary educational leadership antagonistic to the ideals of progressive education has commanded and is commanding today a vast army of conservative educators bound by the educational traditions of the past. It is true, however, that a few ultra-progressive educational leaders have adhered to and advanced certain chimericalisms in education, so utterly fantastic in their unreality, that the eyes of the public educational leadership were constantly fixed on them not in acceptance, but in aversion and closely-guarded opposition. These philosophies have served only to augment and maintain the conservative educational phalanx.

The decline in the emphasis on mathematics in public education rests solely on the shoulders of the reactionary educational leadership of the country, who in the present emergency must either admit the truth of this fact or else confess that, as a majority group, they have been extremely impotent in their educational efforts.

By the latter part of the nineteenth century the organization of the content of mathematics had become so crystallized that it was universally thought of as a series of unrelated iron-bound compartments. This organization became so pronounced and so imbedded in the minds of mathematicians that even the militant leadership of a few forward-looking individuals of each generation for the past half-century or more has done very little to change its status quo. E. H. Moore in the United States, John Perry in England, and Felix Klein in Germany at about the same time offered the first serious criticism of the compartmentalized instruction of mathematics in the secondary schools, proposing in its stead an integrated type of instruction, and stressing the practical phases of mathematics. Unfortunately their criticism reached very little farther than the unification of content, and offered no working basis of integration. Consequently such integrated organizations of content as have been proposed in the past few decades have been little more than hodge-podges of material lifted bodily from the compartmentalized organization, more often than not quite non-related. The integrated organization has met with little success because of the absence of a basis of organization.

The Reorganization of Mathematics in Secondary Education, a report of the National Committee on Mathematical Requirements of the Mathematical Association of America, published in 1923, more clearly defined the aims of mathematical instruction and more definitely outlined the content of instruction than had been done prior to this time. Although it was widely accepted by teachers, writers, and educational leaders, yet its influence fell far short of revolutionizing the teaching of mathematics.

The Place of Mathematics in Secondary Education, a joint report of the Mathematical Association of America and the National Council of Teachers of Mathematics, published in 1940, makes a forward step in the classification of objectives in mathematical instruction, in that it more nearly defines objectives in terms of the adjustments of the child than had previously been done, but it was woefully weak in its failure to suggest an organization based upon mathematical procedures utilized in human

activities by means of which such adjustments might be made. This study preceding so closely the present emergency and failing to suggest a vitalized activity program of organization, the program now being ushered in by the emergency, seems to be doomed to be shorn of much of the influence it might have had under more favorable circumstances.

It is unfortunate that a vitally needed philosophy or a basic method of procedure must await the coming of a dire emergency, global in its scope, in order to be generally recognized and properly evaluated. It has been known for centuries that the human organism learns to do by doing, and that learning at its best occurs in the presence of an immediate felt need for the thing learned. The learner of mathematics in the past has been a passive recipient of mathematics rather than an active participant in the application of the quantitative procedure to activities involved in human relationships. That beautiful and logical creation known as mathematics has been dangled before the eyes of the amazed and stupefied student as something to be accepted and learned because of its intrinsic value rather than because of what can be done with it. Mathematics as a mode of thought, a method of work, an instrument of investigation, and the servant of mankind in the pursuit of truth has not been sufficiently demonstrated in its actuality in the teaching process. The world-wide social revolution, of which the present war is only a part, has vividly brought to the forefront the crying need for applied mathematics and the utilization of the quantitative procedure in the thought process as well as in methods of work. Perhaps the emergency may bring about the consummation of the efforts of the mathematical and educational reformers of the past in the revitalization of mathematical education through the utilization of human activity as the basis of the reorganization of mathematical content, in which it had in the most part its inception.

This means that the teaching of mathematics will have to be revolutionized. Barriers and prejudices of long standing must be broken down. Both the knowledge of mathematical content and professional training must be recognized as indispensable prerequisites in the preparation of teachers of mathematics. No longer can the teacher of mathematics be hide-bound by tradition. Teacher training must comprehend the preparation for teaching rather than the preparation for research, both in the content and professional phases of the work. The teacher must be well-grounded, especially in science, social science, and industrial science, and must possess a rich background of experience. The

teacher can not continue to enjoy a cloistered existence, immune from the realities of life, but must possess a broad knowledge of life, and be able to cope on a par with individuals of other vocations and professions. Both specific and generalized training must be an integral part of teacher preparation.

The general public must be kept aware of the significance and usefulness of mathematics. More publications, such as Hogben's **Mathematics for the Million,** will be needed to popularize mathematics with adults, whose experience with mathematics in the classroom often developed a confirmed bent against it. The organization and presentation of the subject matter of mathematics in the public schools must be depended upon to develop and maintain a permanent interest, on the part of future generations, in the subject and its applications. Classroom general and specific techniques must be modernized in the light of present day education and psychology. More and more mathematical instruction in the public schools must pave the way for the preparation for mathematical research, for research must go hand in hand with the revitalization and improvement of teaching, if the search for truth is to continue as a legitimate outcome of education in a democracy. Mathematical instruction must break the bounds of the classroom convincingly and effectively and permeate every phase of modern life.

Will the impetus given the practical utility of mathematics and the interest in mathematics by the present emergency penetrate the stolid wall of traditional organization and presentation with sufficient force to arouse the teachers of mathematics to a necessity for a more vitalized type of organization and presentation? Only time will tell. It seems probable that, if the social revolution of the past quarter of a century continues with unabated effectiveness, many landmarks of long standing may be swept away, including some outstanding ones in the teaching of mathematics. Since the ultimate end of mathematics is to aid the human race in seeking for truth, thereby attaining a greater degree of freedom, it seems that mathematicians and the teachers of mathematics should be willing to fall in line and keep step with an age of progress endeavoring to know the truth.

# THE SCIENCE TEACHER AND THE POST-WAR WORLD

Dr. R. J. Slay

Today we are in the midst of a conflict which will ultimately decide the fate of the democratic way of life. Each one of us will have his part in making this final decision. If democracy emerges victorious, we will still have a major task to perform; and the success with which we carry out the post-war problems will determine the degree of permanence our democracy will enjoy. New problems will arise out of the chaotic conditions we now endure, and we must meet these problems and solve them or our democratic way of life will be insecure. Knowledge of what these problems will be cannot be had until we are faced with them, but the method for their solution is fairly clear. Problem solving is based upon a natural method which is common to all situations and can be used by all who are willing to adopt its procedure. The so-called problem-solving method can be illustrated by the work of the research scientist. When a problem confronts the scientist, he attempts the solution by first making careful observations to ascertain the nature of the problem. He then sets to work through experimentation to determine the possible ways of solution. After careful observations and experimentation, he reaches temporary conclusions which when adequately tested result in the final conclusions. He arrives at conclusions only after careful observations and experimentation and the testing of results. This method is commonly called the scientific method. But, you say, all the problems arising from war-time conditions are not scientific. True, but the solving of them can be scientific. Exercising the privilege of voting, establishing a business, operating a farm, or raising a victory garden demands the same method as the organization and carrying out of scientific research in the laboratory. What we, as citizens, need is an understanding of the operation of this method of problem solving. It should be so ingrained in our thinking that its use becomes automatic. When we face a new situation or problem, we should attempt to solve it only after we have obtained all the evidence and have carefully weighed it. This will eliminate blunders caused by "snap judgments" and "short-

sightedness," and will remove interference of sound judgments by prejudice and malice.

The responsibility for the development of this method falls upon the schools, and the success of the schools depends most of all upon the teachers—their training and attitude toward the profession of teaching. The success of a democracy depends upon the education and attitude of its citizens. So we find that perhaps the greatest task in the re-shaping of the democracies after the war will fall upon the teachers of the nations. The field of natural science offers splendid opportunities for the development of the scientific method of study. Children are brought face-to-face with the realities of their environment and by these contacts can discover for themselves the hidden secrets of nature. They are given opportunities to observe natural phenomena and with observation comes curiosity which leads to permanent interest. Once interest is established, the teacher's battle is more than "half-won." Natural phenomena have always appealed to the interests of mankind. The science of today is an outgrowth of the observations of natural phenomena. The work of Newton, Galileo, and others of the early centuries was the forerunner of our more modern scientific researches in science. Teachers of science can find in the offerings of nature the materials with which to build a program of science education that can be of vital use in the development of the method of problem-solving. They are the gateway which stands between the child and his environment and are the guiding influences in the interpretation and appropriation of these materials to his own use.

Science teachers will have a very large share in this all-important post-war education. Scientific research is being intensified under the pressure of wartime needs, and the results of the numerous investigations are accumulating at an unprecedented rate. True, the research is largely directed toward the winning of the war, and much of it works for despotism rather than for democracy; yet out of it all will come many inventions and discoveries that will be of great use to humanity in post-war living,—proofs again of the poetic truth uttered nearly three centuries ago:

*"Sweet are the uses of adversity,*
*Which like the toad, ugly and venomous,*
*Wears yet a precious jewel in his head."*

Already, many of these new war impelled discoveries are challenging our pre-war teaching. New developments in foods and

nutrition are upsetting our complacency in the normal diet of the individual. We do not need to insist upon the necessity of certain foodstuffs in order to supply the necessary vitamins and minerals for normal nutrition. Researches have shown that the common foods can be impregnated with synthetic vitamins and common minerals, and the nutritional results will be the same. Flour, meal, and breads are now being "fortified" with minerals and vitamins for our armed forces; and the results of this new method seem satisfactory. In the matter of transportation and communication, we have reached a new "high." We converse with all peoples of all lands and travel is world-wide. In the field of drugs and medicines we have reached an unprecedented peak. The once unconquerable diseases are now becoming subdued, and casualties resulting from wounds in battle are the lowest in history. What developments will take place in industry and agriculture can only be conjectured.

Our post-war science instruction faces a serious problem. Not only must the eternal truths of science be retained, but many of the changes, and added accumulations from this conflict, must be incorporated. From this chaotic state of affairs must come an organized body of scientific material which can be administered by the schools, and the teachers of science will have to assume the greater part of the responsibility. Youth will demand a knowledge of these newer discoveries. Schools will have to provide him with the facilities for this learning; and the science teachers will have to furnish the guidance.

It is not to be supposed, however, that science teachers will be able to become proficient in all the results of this experimentation. This is not possible now in a single field of science. But it can be assumed that science teachers can be trained in the scientific method of problem-solving and that they can pass this on to the incoming generations of youth.

It becomes clear, then, that the training of science teachers is of paramount importance in post-war education—and what kind of training should this be? A report of the National Committee on Science Teaching has this to say: "We believe that an important function of the teacher with a competence in science is to engage with his students in discovering meaningful problems, in delimiting and organizing them into workable patterns, in proposing possible solutions, and in testing the adequacy of these proposed solutions. How may this be achieved? Certainly not by the technic of lecturing about scientific-mindedness and scientific methods. There is no better way—probably no other way—

for the teacher to develop the ability to help his students with their problems than to engage in the discovery and solution of problems meaningful to him and to them. Available time, money, resources, and trained personnel must be devoted to providing these experiences. Some of the objections to procedures designed to develop ability in problem-solving arise out of distaste for the kind of work necessitated or out of sheer inertia. It is true that the college instructor who is burdened with large classes, committee responsibilities, and research interests of his own is loathe to embark upon an ambitious program of education which is perhaps new and consequently difficult for him; but the responsibility is nevertheless his. The prospective teacher must be given opportunity to test hypotheses, to bring to bear on problems knowledge already acquired in the area of his interest, and to develop solutions to his problems which will stand critical tests for adequacy and consistency. The importance of the development of this ability among the teachers of science is too great for it to be left to chance. Scientific-mindedness and scientific attitudes are formed laboriously, sometimes without tutoring, but much more surely by practice under skillful guidance. The teacher-training institutions must provide this guidance for the prospective teacher.

"A new and larger conception of laboratory work," the report continues "should be established and further emphasized by the teacher's participation in community problems. The prospective teacher should see himself as a prospective social engineer, with scientific training which enables him to find and understand certain problems better than persons with different training, to suggest possible solutions for these, and to test the adequacy of his suggested solutions through suitable checks and experiments. He should recognize his responsibility as a citizen to join hands with whatever agencies exist in his community for the achievement of the common welfare and to instigate investigations in the fields of his special competence which he recognizes as desirable. Through his professional education, as much as through his subject-matter education, he should be taught the values of cooperative action, suspended judgment, and critical methods of thinking and problem-solving."

It would seem clear, then, that the responsibility for training teachers of science for post-war youth rests with teacher-training institutions—institutions that conceive of their specific function as the training of teachers. In these institutions there is less departmentalization and more cooperative effort toward a com-

mon end. The specific techniques, skills, and knowledges are "pooled" in a concerted action to develop the individual student rather than to develop competence in any one field of subject matter of teacher-training institutions. The science departments attempt to give their students not only competence in science, but also a method by which this competence can be utilized by the prospective teacher in dealing with school pupils. Liberal arts institutions for the most part stress science competence only. They seem to operate on the assumption that a knowledge of science is sufficient for the training of a teacher of science. It is obviously to be assumed that a knowledge of science is necessary for the teacher; however, there is need to recognize that this knowledge will not of itself provide the student with the perspective of teaching or the ability to organize science content into suitable materials for the grade levels to be taught. The knowledge of science alone is not sufficient even for the training of the research scientist, although he is more dependent upon scientific facts than is the teacher. He too must develop the method of problem-solving, for it is upon this method that he must depend for accurate conclusions to his observations and experimentations. The beginning specialist learns to depend upon the results of careful experimentation and becomes an enthusiast for this type of work. He becomes an intensive rather than an extensive experimenter. His work becomes fascinating to him, and soon his entire efforts are confined to research alone. It is not the purpose here to discount the work of the experimenter—it is to him we look for leadership in scientific progress; but in a democratic society "followship" is as important as leadership, and it is the business of someone to assume the responsibility of directing and guiding the followers as well as the leaders.

Science education for all youth in the post-war world, then, becomes the responsibility of the teachers of science—teachers of youth whose ambition may be that of becoming a research scientist, teacher, or just plain citizen—whether his problems are scientific, industrial, educational, or political. Education begins alike for all children—as we so often say, the elementary school is the school for all the children of all the people. The science teacher must be capable of making the newer concepts of science ushered in by the stress of war as well as the age-old truths of science available to all peoples of all the earth.

# ANNOTATED LIST OF RECENT REFERENCES

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## The General Program

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